Claims

1. Method of preparing a pressure-sensitive adhesive comprising the steps of:

(i) providing an essentially solvent-free mixture comprising one or more free radically polymerizable monomers having one ethylenically unsaturated group and at least one free-radical polymerization initiator,

(ii) partially polymerizing said mixture to provide a partially polymerized mixture exhibiting a Brookfield viscosity of between 1,000 and 125,000 mPa·s at 20 °C and a degree of conversion of monomers to polymer of between 30 – 60 wt. % with respect to the initial mass of the monomers prior to polymerization,

(iii) adding one or more free-radical radiation polymerization initiators to the partially polymerized mixture to provide a radiation-curable precursor,

(iv) applying the radiation-curable precursor to a substrate, and

(v) further polymerizing the radiation-curable precursor by subjecting it to actinic irradiation to provide said pressure-sensitive adhesive.

2. Method according to claim 1 wherein the partial polymerization of the mixture is performed under essentially adiabatic polymerization conditions.

3. Method according to claim 1 wherein the radiation-curable precursor exhibits a Brookfield viscosity at 20 °C of from 1,000 to 150,000 mPa·s.

4. Method according to claim 1 wherein the one or more free-radical polymerization initiators are thermally activatable polymerization initiators

5. Method according to claim 4 where the one or more thermally activatable free-radical polymerization initiators are selected from a group comprising organic peroxides, organic hydro peroxides and azo-group containing compounds.

6. Method according to claim 1 where the one or more free-radical polymerization initiators are present in an amount of between 0.0005 – 0.5 wt. % with respect to the mass of the one or more monomers.

7. Method according to claim 1 wherein the one or more free-radical radiation polymerization initiators are selected from a group comprising type I and type II photoinitiators.

8. Method according to claim 1 wherein the one or more free-radical radiation polymerization initiators are present in an amount of between 0.25 – 10 wt. % with respect to the mass of the radiation-curable precursor.

9. Method according to claim 1 wherein the polymer in the partially polymerized mixture obtained by conversion of monomers to polymer is characterized by a polydispersity M_W/M_n of between 2 and 3.

10. Method according to claim 1 wherein the polymer in the radiation-curable precursor obtained by conversion of monomers to polymer is characterized by a polydispersity M_W/M_n of between 2 and 3.

11. Method according to claim 1 wherein the further polymerization of the radiation-curable precursor is performed in a non-inert atmosphere.

12. Method according to claim 1 wherein the radiation-curable precursor comprises one or more heat-activatable blowing agents.

13. Method according to claim 1 wherein upon further polymerization of the radiation-curable precursor at least 95 % of the monomers have been converted to polymer.

14. Method according to claim 1 where the substrate is selected from a group comprising paper, textile, non-woven, polymer, metal or wood substrates.

15. Method according to claim 1 where the mixture is applied to the substrate by coating or printing.

16. Radiation-curable precursor obtainable by polymerizing an essentially solvent-free mixture comprising one or more free radically polymerizable monomers having one ethylenically unsaturated group and at least one free-radical polymerization initiator to a degree of conversion of monomers to polymer of between 30 – 60 wt. % with respect to the initial mass of the monomers prior to polymerization, and adding one or more free-radical radiation polymerization initiators to such partially prepolymerized mixture, wherein said radiation-curable precursor exhibits a Brookfield viscosity at 20 °C of from 1,000 to 150,000 mPa·s.

17. Radiation-curable precursor according to claim 16 wherein the polymer obtained by polymerizing the monomers to a degree of conversion of between 30 – 60 wt. % with respect to the mass of the monomers has a polydispersity M_W/M_n of between 2 and 3.

18. Radiation-curable precursor according to claim 16 comprising one or more thermally activatable non-encapsulated blowing agents and/or encapsulated microspheres.

19. Supported or unsupported pressure-sensitive adhesive tape comprising at least one layer of a pressure-sensitive adhesive wherein the pressure-sensitive adhesive is obtainable by a method of claim 1.